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# An Investigation of Strategies to Reduce Structure Rule Coding Errors in Vroom & Yetton's Normative Model of Leadership

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Stephen

1976



AN INVESTIGATION OF STRATEGIES TO REDUCE STRUCTURE RULE  
CODING ERRORS IN VROOM AND YETTON'S NORMATIVE  
MODEL OF LEADERSHIP

A Thesis

Presented to

the Faculty of the Department of Psychology  
Western Kentucky University  
Bowling Green, Kentucky

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

by

Stephen Herbert

July 1976

AN INVESTIGATION OF STRATEGIES TO REDUCE STRUCTURE RULE  
CODING ERRORS IN VROOM AND YETTONS NORMATIVE  
MODEL OF LEADERSHIP

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AN INVESTIGATION OF STRATEGIES TO REDUCE STRUCTURE RULE  
CODING ERRORS IN VROOM AND YETTONS NORMATIVE  
MODEL OF LEADERSHIP

Stephen Herbert

July 1976

54 pages

Directed by: Ray Mendel, Sam McFarland, and Carl Martray

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Four versions of the structure rule and two levels of training were investigated in an attempt to eliminate structure rule coding errors in Vroom and Yetton's (1973) Normative model of leadership. One hundred and sixty volunteer general psychology students received either thirty or ninety minutes of training on the Normative model and then responded to fifteen hypothetical situational problems. A 2 X 4 analysis of variance failed to reveal any significant effects. Neither the training nor structure rule effect was found to be significant. There was also no interaction between training and structure rule. Therefore, the various formats of the structure rule were not effective in eliminating the incorrect coding of the rule and training did not improve subjects' coding accuracy. These findings are inconsistent with previous research. Several differences between the present study and previous research which may account for these inconsistent findings are mentioned, e.g., subjects, trainers, and training strategies. A number of implications for future research are also

indicated, e.g., massed versus spaced and whole versus part training, motivation of subjects, and increased training time.



## Chapter I

### Introduction and Literature Review

The investigation of leadership has been one area of interest to psychologists which has had potentially great importance to the problems of society. The quality of a society's leadership is often reflected by how effective its social systems are functioning.

The process of leadership has been studied by psychologists for several decades. The traditional models of the leadership process, exemplified in the approaches of Stogdill, Bass, and McMurray, have been autocratic in nature (Vroom and Yetton, 1973). The leader makes all decisions and issues all orders or directives to his subordinates. Many highly rational solutions to problems have become ineffective because of resulting resistance and opposition by subordinates.

Consequently, psychologists have turned their attention toward the psychological and social processes in the leadership area. One outgrowth has been an emphasis on participative decision making. Supporters of participative decision making (PDM) assume an important need of workers is being involved in decisions affecting their work. Therefore,

the personal commitment necessary to motivate the worker is achieved through worker participation.

In reviewing the PDM literature, Vroom and Yetton (1973) indicate that empirical evidence provides some but not overwhelming support for the notion of increased satisfaction and productivity among workers or leaders using PDM in the leadership process. As suggested by Lowin (1968), almost all of the evidence falls into one of three categories: (1) experimental studies conducted in organizations, (2) experimental studies conducted outside of organizations, (3) observational studies conducted in organizations. The present classification was chosen because the diversity of studies made it cumbersome to classify the evidence according to the dependent variable measured in each study.

#### Experimental Studies Conducted in Organizations

A number of experimental studies conducted in organizations found PDM to be effective (Coch & French, 1948; Bavelas, 1950; French, Ross, Kirby, Nelson, & Smyth, 1958; Lawrance & Smith, 1955; King, 1964; French, Kay, & Meyer, 1966; Bavelas & Strauss, 1966; Rice, 1953; Kuriloff, 1966). Coch and French (1948) investigated a plant experiencing serious employee resistance to method and job changes. Three experimental and one control groups were involved in the study. In one experimental group, workers were permitted to influence some aspect of change pertaining to



a new job only through their elected representatives. In the other two experimental groups, each person could participate directly in making decisions. In the control group, the change was introduced by management. The results indicated that productivity in the control group dropped following the introduction of the change and did not improve substantially with time. The productivity in the experimental groups that elected representatives also dropped but regained its previous production level after fourteen days. The experimental groups that participated fully recovered the prechange level after fourteen days. They continued to improve until they reached a level of performance that was fourteen percent above what they had attained prior to the change.

Bavelas (1950); Rice (1953); Lawrance and Smith (1955); Kuriloff (1963); French, Kay, and Meyer (1966); and Bavelas and Strauss (1966) investigated groups that participated in setting their own production goals. In Bavelas' (1950) study, women were allowed to set a group goal for higher productivity in the experimental groups while women in the control groups were not. The results indicated an eighteen percent increase in production in the experimental groups which was maintained over a two month period. In the control groups, the level of production remained relatively constant. Unfortunately in Bavelas' (1950) study, it is impossible to determine the extent to which the reported

production increase was due to the groups participation in goal setting or to the fact that they received continual feedback concerning their level of achievement. Rice (1953) investigated small groups of employees that participated in making decisions effecting productivity. After an immediate increase in the experimental groups at the cost of increased damage and inadequate maintenance, the results indicated a settling down at a new level of performance in which efficiency was higher and damage was lower. Rice's study indicates that the improvements in productivity were largely the result of prior worker inefficiency and not the introduction of PDM. Kuriloff (1963) investigated the reorganization of an entire plant which comprised about three hundred employees. After the assembly line was abolished, workers reorganized into small self paced work groups. The results indicated a thirty percent increase in productivity. In Kuriloff (1963) study, the improvements in productivity using PDM are questionable considering all production comparisons were made on a pre and post basis. Neither Rice (1953) nor Kuriloff (1963) included groups that did not set production goals in the experimental designs of their studies. Therefore, the effectiveness of PDM in each study is unknown. King's (1964) study involved a reorganization and retraining of employees which were given responsibility for their own work and work organization.



The results indicated an increase in production and satisfaction among workers.

French, Israel, and As (1960); Fleishman (1965); and Mayo (1924) found PDM to be ineffective in their experimental studies conducted in organizations. French, Israel, and As (1960) replicated the experiment of Coch and French (1948). Five four man experimental groups participated in decisions regarding which of five new products should be assigned to each group. The four man control groups did not participate in such decisions. The results indicate that there was no difference between the experimental and control groups regarding their level of productivity. In Mayo's (1924) and Fleishman's (1965) study, the productivity rate for employees also remained the same in PDM and non-PDM groups. However, in Mayo's (1924) and Fleishman's (1965) studies, there were no non-PDM groups that did not participate in the change and worked separately from those who did. Therefore, the results of these studies are also questionable.

Morse and Reimer (1965) found no increase in commitment by PDM groups in their experimental study in an organization. Morse and Reimer (1965) investigated PDM by changing the supervisory hierarchy of a large factory. Some groups participated in making production decisions while other groups did not participate. The results indicate that productivity rose in both groups, however, productivity rose

more in the non-PDM group. The increases were apparently the result of prior worker inefficiency since the non-PDM group's productivity resulted from a cut in the number of employees. Additional data suggests that if the study had continued, the non-PDM groups would have dropped in relative effectiveness.

In summarizing the results of the experimental studies conducted in organizations, it can be seen that PDM was effective in some situations and ineffective in other situations. Criticisms concerning an absence of control groups found in a number of studies as well as prior worker inefficiency among subjects before the introduction of PDM makes it difficult to assess the effectiveness of PDM based upon these studies alone. Therefore, an examination of the experimental studies conducted outside of organizations may offer further insight into assessing the effectiveness of PDM.

#### Experimental Studies Conducted Outside of Organizations

Among the experimental studies conducted outside of organizations, Day and Hamblin (1964) and Haire, Ghiselli, and Porter (1953) found PDM to be effective. Day and Hamblin (1964) investigated authoritarian as compared to democratic supervision in leading groups of female workers in a simulated assembly line task. The results indicated lower productivity was experienced by authoritarian as compared with democratic groups. Haire, Ghiselli, and Porter (1953)



compared the effects of PDM and non-PDM leadership on group judgment. The results indicated that PDM subjects were more satisfied than non-PDM subjects with the results of a group decision.

McCurdy and Eber (1953), Sales (1966), Bennett (1956), and Spector and Suttell (1956) found PDM to be ineffective. McCurdy and Eber (1953) examined different supervisory styles in group problem solving situations. Three groups participated in a task which determined the proper setting for three switches. In the authoritarian condition, one subject could order the others at will. In the democratic condition, each subject could offer suggestions. The results indicated no difference between the two conditions relating to productivity. Bennett (1956) found no difference between group or lecture techniques effecting group decisions. However, Bennett's (1956) findings may have resulted from a failure to equate the level of difficulty of group and lecture materials in his study.

Shaw (1955) found no increase in commitment by PDM groups in his experimental study conducted outside of an organization. Shaw found non-PDM groups to be more productive than PDM groups in all communication networks studied.

In summary, the results of the experimental studies conducted outside of organizations also found PDM to be effective in some situations and ineffective in other

situations. For instance, a number of these studies investigated the effect of PDM and non-PDM supervision on productivity. Day and Hamblin (1964) found PDM supervised groups increased production. Shaw (1955) found no increase in production in PDM groups. Because of these inconsistent findings, it is difficult to assess the effectiveness of PDM based upon these studies. Therefore, an examination of the observational studies conducted in organizations may provide further insight into the effectiveness of PDM.

#### Observational Studies Conducted in Organizations

A number of observational studies conducted in organizations found PDM to be effective (Katz, Maccoly, & Morse, 1950; Wicker, 1956; Tannenbaum & Georgopoulos, 1957; Argyle, Gardner, & Ciofi, 1958; Fleishman & Harris, 1962; Marrow & French, 1964). Katz, Maccoly, and Morse (1950) investigated the relationship between supervision, employee attitude, and productivity. Using clerical workers and their supervisors, high and low production sections were selected for comparison. The results indicated that supervisors of high producing sections were more likely to be employee oriented than production oriented and give general as compared to close supervision. At a telephone company, Wicket (1951) found that women who stayed on their jobs felt they had greater opportunity to make decisions affecting their jobs as compared to women who left their jobs. The women who stayed on their jobs did in fact have



greater opportunity to make decisions affecting their work than the women who left their jobs. Tannenbaum and Georgopoulos (1957) found subordinates under democratic supervision had a higher level of productivity, moral, and satisfaction than subordinates under autocratic supervision. Fleishman and Harris (1962) investigated the form of relationship between leader behavior, indices of group behavior and the interaction effects of consideration and structure. Consideration concerns allowing subordinates more participation in making decisions. Structure concerns behavior in which supervisors organize and define group activity to achieve organizational goals. Subjects described the leadership behavior of their foreman. The results indicated that foremen high in consideration could increase structure without any negative effects on productivity. Argyle, Gardner, and Ciofi (1958) compared ninety working groups with various foremen. The results indicated that productivity increased in democratic as compared to autocratic groups. However, this was only true when piece rates were not enforced in the work groups.

Katz, Maccoby, Gurion, and Floor (1951) found PDM to be ineffective in their observational study. They were unable to replicate the findings of Katz et al. (1950) described previously, and found no relationship between closeness of supervision and productivity in a railroad unit.

Halpin (1954) found no increase in commitment by PDM groups in his observational study of air force pilots. Halpin investigated the interaction effects of consideration and structure. Subordinates and supervisors described the leadership behavior of the subordinates' commanders. Halpin found negative correlations between supervisory rating and consideration scores. Commanders high in consideration could not increase structure without any negative effects on productivity contrary to the findings of Fleishman and Harris (1962).

From an examination of these studies, it appears that participation in decision making has consequences that vary depending on the situation. In one situation, a participative form of decision making may increase a leader's effectiveness. However, in another situation, a participative form of decision making may decrease a leader's effectiveness. Therefore, participative decision making appears not to be appropriate for all situations. Psychologists, however, have begun to develop some hypotheses regarding the conditions under which participation in decision making may increase or decrease the leader's effectiveness.

#### The Normative Model

One approach to dealing with this problem has been the Normative Model of Leadership developed by Vroom and Yetton (1973). According to Vroom and Yetton (1973), there are



three criteria which together define the most appropriate leadership style for a situation. The quality of the decision is the first criterion. This concerns whether decisions made with PDM are of a higher quality than decisions made without PDM. The second criterion concerns a time element. The most appropriate leadership style would be one that involves the least expenditure of man hours to solve a problem. Finally, worker satisfaction is the third criterion. This concerns the acceptance of the decision by subordinates and their commitment to execute it effectively.

The model identifies distinct decision making strategies which can be employed by a leader in any situation. The taxonomy of strategies is indicated in Table 1. The autocratic, consultive, group, and delegative strategies of leadership are arranged in two columns corresponding to their applicability to problems which involve a group or a single subordinate. The strategies run from the extremely participative, delegative form of decision making to the non-participative, autocratic form of decision making.

To determine the style of leadership appropriate to a particular situation, Vroom and Yetton (1973) offer seven rules. The seven rules are expressed in the form of questions and can be seen in Table 2. The quality rule concerns the extent to which one solution is likely to be more rational than another. This attribute concerns the

Table 1

## Vroom and Yetton's Taxonomy of Decision Making Strategies

Group Problems		Individual Problems
Authoritarian I	You solve the problem or make the decision yourself, using information available to you at the time.	Authoritarian I You solve the problem or make the decision by yourself, using information available to you at the time.
Authoritarian II	You obtain the necessary information from your subordinates, then decide the solution to the problem yourself. You may or may not tell your subordinates what the problem is in getting the information from them. The role played by your subordinates in making the decision is clearly one of providing the necessary information to you, rather than generating or evaluating alternative solutions.	Authoritarian II You obtain the necessary information from your subordinate, then decide on the solution to the problem yourself. You may or may not tell the subordinate what the problem is in getting the information from him. His role in making the decision is clearly one of providing the necessary information to you, rather than generating or evaluating alternative solutions.



Table 1 (cont.)

Consultative I	You share the problem with the relevant subordinates individually, getting their ideas and suggestions without bringing them together as a group. Then you make the decision, which may or may not reflect your subordinates' influence.	Consultative I	You share the problem with your subordinate, getting his ideas and suggestions. Then you make a decision, which may or may not reflect his influence.
Consultative II	You share the problem with your subordinates as a group, obtaining their collective ideas and suggestions. Then you make the decision, which may or may not reflect your subordinates' influence.	Group I	You share the problem with your subordinate, and together you analyze the problem and arrive at a mutually agreeable solution.
Group II	You share the problem with your subordinates as a group. Together you generate and evaluate alternatives and attempt to reach agreement (consensus) on a solution. Your role is much like that of chairman. You do not try to influence the group to adopt "your" solution, and you are willing to accept and implement any solution which has the support of the entire group.	Delegative I	You delegate the problem to your subordinate, providing him with any relevant information that you possess, but giving him responsibility for solving the problem by himself. You may or may not request him to tell you what solution he has reached.

Table 2  
Vroom and Yetton's Seven Rules  
for Analyzing Situational Problems

---

Quality Rule

A. Is there a quality requirement such that one solution is likely to be more rational than another?

Information Rule

B. Do I have sufficient info to make a high quality decision?

Structure Rule

C. Is the problem structured?

Goal Congruence Rule

D. Is acceptance of decision by subordinates critical to effective implementation?

Commitment Rule

E. If I were to make the decision by myself, is it reasonably certain that it would be accepted by my subordinates?

Selling Own Solution Rule

F. Do subordinates share the organizational goals to be attained in solving this problem?

Conflict Rule

G. Is conflict among subordinates likely in preferred solutions? (This question is irrelevant to individual problems.)



importance of finding a high quality solution. A leader having sufficient information to make a high quality decision is indicated by the information rule. The structure rule takes into consideration the extent to which the leader knows what information is needed who possesses it and how to collect it. The structure rule refers to the location and specificity of the information. Subordinates basing solutions on organizational considerations is indicated by the goal congruence rule. The rule indicates the extent to which subordinates can be motivated to pursue a solution to the problem which focuses on the goals of the organization. The commitment rule refers to whether acceptance of the decision by subordinates is critical to effective implementation. The extent to which it is certain that subordinates will accept a solution made by a leader alone is indicated by the selling own solution rule. This attribute concerns the extent to which the leader believes that his decision made autocratically would be accepted by subordinates. Last of all, the conflict rule refers to whether conflict among subordinates is likely in the preferred solution.

To analyze a situation, a leader would answer the seven questions sequentially to arrive at a particular problem type. A particular problem type indicates a feasible set of leadership styles to be used in the situation. The sequential analysis strategy of situations

(decision tree) is indicated in Figure 1. To use the decision tree, a leader would begin at the left side of the figure and answer the quality question. If he answered "yes," he would proceed to the information question. If he answered "no," he would skip the information and structure questions and answer the goal congruence question. By using the decision tree in this manner, there are fourteen possible problem types that describe all situations. A listing of feasible sets of leadership styles for each problem type is indicated in Table 3. For the first problem type, there are five possible leadership styles to use in a group or individual problem. The most appropriate leadership style for each problem type is the first style in each of the feasible sets. This is based upon the quality of the decision as well as the least expenditure of man hours to solve a problem and the acceptance of the decision by subordinates.

Suppose a leader had to decide which style of leadership would be most appropriate for solving a group problem. The leader would analyze the situation by answering the seven questions through the decision tree. In this situation, suppose there was not a quality requirement such that one solution was likely to be more rational than another. The leader would then decide if acceptance of the decision by subordinates was critical to effective implementation. Suppose the answer to this question was "yes."



Figure 1

Vroom and Yetton's Sequential Analysis Strategy for  
Situational Problems (Decision Tree)

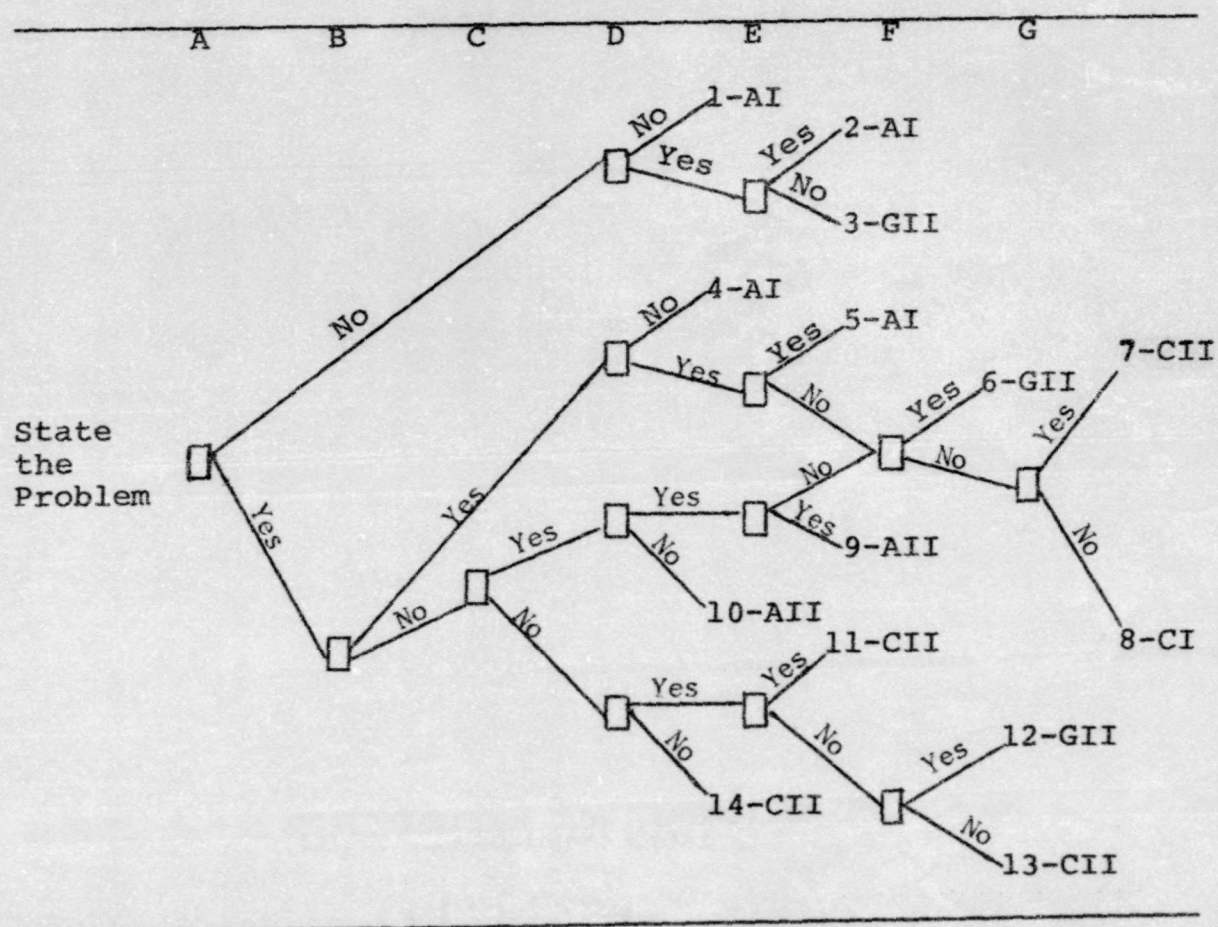


Table 3  
 Vroom and Yetton's Feasible Sets of Leadership  
 Styles for Various Problem Types

---

1. AI, AII, CI, CII, GII	8. CI, CII
2. AI, AII, CI, CII, GII	9. AII, CI, CII
3. GII	10. AII, CI, CII
4. AI, AII, CI, CII	11. CII
5. AI, AII, CI, CII	12. GII
6. GII	13. CII
7. CII	14. CII

---

A: Autocratic

C: Consultive

D: Delegative

G: Group



The leader would next decide if he made the decision himself whether it is reasonably certain that it would be accepted by his subordinates. An answer of "yes" would indicate problem type 2 and that a leadership style in the second feasible set would be appropriate to solve the group problem. Therefore, an autocratic style of leadership would be most effective.

## Chapter II

### Statement of the Research Problem

Thirty hypothetical situational problems have been developed by Vroom and Yetton (1973) for training subjects on the Normative model. The subjects read each problem and then answer (code) the seven rules through the decision tree. The utility of the Normative model presupposes correct coding of the problems by the subjects. However, problems are frequently incorrectly coded. Vroom and Yetton (1973) indicate in Table 4 the extent of coding errors for the seven situational variables by three groups of subjects who vary in training time. As can be seen from the table, the structure rule is most often incorrectly coded. False negative errors (coding a problem as unstructured when it is structured) are relatively infrequent, but false positive errors (coding a problem as structured when it is unstructured) are much more common. Vroom and Yetton (1973) attempted to eliminate the problem of structure rule coding errors by specifically training subjects on the application of the rules in the Normative model. They found that training reduced, although evidently did not eliminate the errors. Yetton (1975) more recently attempted to further eliminate these structure coding errors by changing subjects'



Table 4

The Coding Errors for Three Groups of Subjects Receiving  
Various Amounts of Training on Thirty Situational Problems  
Reported by Vroom and Yetton (1973)

Situational Variables	Percentage Error		
	Group I 1 Hour	Group II 3 Hours	Group III 5 Hours
Quality	28%	8%	7%
Manager's Information	32	4	7
Problem Structure	39	30	19
Acceptance	28	12	12
Prior Probability	22	21	13
Goal Congruence	38	23	9
Conflict	42	8	12

perspective on the rule. This was accomplished by altering the language of the rule. Yetton's modified structure rule reads as follows: "If leaders can give a clear operational definition of the problem and specify some of the alternative solutions and strategies for their implementation, the problem is structured" (Yetton, 1975, p. 6). Structured problems are solved by "the group as a whole deciding on the optimal solution" (Yetton, 1975, p. 6). If leader cannot meet this criterion, the problem is to be coded unstructured. Unstructured problems are solved by "the group deriving an adequate solution" (Yetton, 1975, p. 6). Yetton indicates that by modifying the language of Vroom and Yetton's (1973) structure rule it was possible to substantially reduce the high error rates relating to judgments about problem structure.

However, the language used by Yetton in modifying the structure rule to improve coding conflicts with the prescriptions of the Normative model. The specific problem concerns how structured problems should be solved. Yetton (1975) indicated in his modified statement of the structure rule that structured problems should be solved by "the group as a whole deciding on the optimal solution" (Yetton, 1975, p. 6). However, in the Normative model, three out of five prescribed leadership styles that result from coding a problem as structured are situations in which the leader should make the decision himself after sharing the problem



with subordinates. Consequently, the language Yetton uses in his modified statement of the structure rule invalidates or conflicts with the prescriptions of the Normative model.

Therefore, one goal of the present study is to evaluate Yetton's modified structure rule and examine its coding accuracy. In addition to Yetton's modified structure rule, three other versions of the structure rule are also included in the present study in an attempt to arrive at an "optimal version" of the rule that produces the smallest number of coding errors. The four versions of the structure rule can be found in Appendix A.

Vroom and Yetton (1973) indicate that training influences the accuracy of problem coding. In Vroom and Yetton's (1973) study, three groups of subjects received various amounts of training and then coded thirty problems. Group I received one hour of training. Group II received three hours of training and practice using the model on four written cases. Group III received five hours of training and practice using the model. Table 4 indicates the error rates for the three groups. A judgment was classified as an error if it did not agree with Vroom and Yetton's own coding of the problem attributes. As can be seen from Table 4, Group I had the highest error rates and Group III the lowest error rates. Thus with training, low error rates can be achieved for judgments about a problem's status on most of the seven dimensions.

Therefore, an additional goal of the study is to evaluate the effects of two levels of training on coding accuracy. Minimum training of thirty minutes and maximum training of ninety minutes represents the two levels of training used in the present study. Thirty and ninety minutes of training were selected for two reasons; to determine whether a smaller amount of training than the one to five hours of training used by Vroom and Yetton (1973) could be effective, and to determine whether the amount of training given to subjects interacts with the forms of the structure rule used in the present study. It is possible that one form of the structure rule may require more training than another to adequately acquaint subjects with the rule.



## Chapter III

### Methods

#### Subjects

One hundred and sixty volunteer subjects from beginning psychology classes at a Southeastern regional university took part in this study. Most subjects received extra class credit for their participation.

#### Situational Problems

Fifteen situational problems developed by Vroom and Yetton (1973) were selected for the present study.

#### Design

The present experiment consisted of a 2 X 4 factorial analysis of variance. The two design factors were training time and several versions of the structure rule. The two levels of training involved minimum training of thirty minutes and maximum training of ninety minutes. The four versions of the structure rule described in Appendix A consists of Vroom and Yetton's (1973) original statement of the structure rule, Yetton's (1975) modified statement of the structure rule and the author's abbreviated modified statement and complete modified statement of the structure rule. The dependent variable was the number of problems correctly coded on the structure rule in each treatment condition.

### Procedure

The present study contained eight training groups. The author assigned the first 20 subjects that volunteered to the first group. The second 20 subjects that volunteered were assigned to the second group, with sets of 20 subjects being assigned to the remaining six groups in this manner. The procedure was the same for each group except for the amount of training and form of the structure rule that was used. The eight groups are indicated in Appendix B. All subjects received handouts containing the taxonomy of decision making strategies (Table 1), the decision tree (Figure 1), the taxonomy of leadership styles (Table 3), and the definition of each of the seven rules (Appendix C). The structure rule was varied on the handouts containing the seven rules depending on the training condition.

At the beginning of the minimum training condition, all subjects received handouts describing the various parts of the Normative model. A five minute introduction to the area of leadership research was given to the subjects to begin the training session. The introduction indicated that leadership models in the past have been autocratic in nature. The leader makes all decisions and issues all orders or directives to his subordinates. The subjects were then informed that recent leadership models have become more democratic in nature. The leader shares the problem with subordinates and together they derive a solution. Vroom



and Yetton's Normative model of leadership was next introduced by describing the various parts of the model through the handouts given to the subjects. The autocratic, consultive, group, and delegative strategies of decision making were described to the subjects by reading the description of each strategy from the handout given to them. Five minutes was used to describe this part of the model. Then the subjects received a ten minute description of the seven rules and decision tree. The seven rules were described by briefly reading through the handout containing the description of each rule. The decision tree was explained by using an example to work through the tree. The feasible sets of leadership styles was next explained in a five minute session. It was indicated to the subjects that the most appropriate leadership style is the first style in each of the feasible sets. Subjects were informed that this is based upon three criteria which together define the most appropriate leadership style for a situation. The criteria was described to the subjects. Subjects then discussed any questions they had up to this point.

At the beginning of the maximum training condition, all subjects received handouts describing the various parts of the Normative model and two practice situational problems. A ten minute introduction was given to the subjects over the area of leadership research to begin training. The content of the introduction was the same given to subjects in the

minimum training condition except that examples of autocratic and democratic leadership models were described to the subjects (Stogdill, 1959; McGregor, 1960). In the maximum training condition, the Normative model was also described to the subjects through the handouts given to them. The taxonomy of decision making strategies was described to the subjects by reading through the description of each strategy on the handout given to them and giving an example of each. Thirty minutes was used to describe the decision tree and the seven rules. The seven rules were described by reading through the handout explaining the rules and giving an example of each rule. The decision tree was described by using two examples to work through the tree. The feasible sets of leadership styles was then described in a ten minute session. The session indicated that the most appropriate leadership style is the first style in each of the feasible sets. The three criteria which together define the most appropriate leadership style for a situation was described using a number of examples. Subjects next participated in two thirty minute practice sessions. One practice situational problem was given to the subjects during each session. After the subjects had read and answered the seven rules for each problem, they compared their answers with Vroom and Yetton's answers for each problem. Subjects then discussed any questions they had up to that point.



After the minimum and maximum training sessions, the fifteen situational problems and answer sheet were given to all subjects. Subjects were instructed to use the seven rules to code the fifteen problems and write a "yes" or "no" answer to each question (rule) on the answer sheet. The instructions given to the subjects are shown in Appendix C. After the subjects had coded the fifteen problems, they were debriefed and dismissed.

## Chapter IV

### Results and Discussion

The aim of this study was two-fold: To evaluate the effects of structure rule form as well as training on coding accuracy. A 2 X 4 analysis of variance failed to reveal any significant effects. Neither the training nor structure rule form effect was found to be significant. There was also no interaction between the training and structure rule. Table 6 indicates these findings. Therefore, the formats of the structure rule were not effective in eliminating the incorrect coding of the rule. Training did not improve subjects' coding accuracy.

Table 5 indicates the percentage of errors for each of the seven rules for each training condition. As can be seen from the table, the percentage of errors was about the same for each rule in both training conditions. Therefore, it appears that ninety minutes of training did not result in a smaller percentage of errors than thirty minutes of training. High error rates are found for all of the rules except for the quality rule. The error rates for the quality rule are similar to the error rate Vroom and Yetton (1973) found for the sixty minute training group reported in Table 4.



Table 5  
The Coding Errors for Two Groups of Subjects  
on Fifteen Situational Problems

Situational Variables	Percentage Error	
	Group I 30 Minutes	Group II 90 Minutes
Quality	25%	21%
Information	60	61
Structure		
1	60	67
2	68	71
3	73	66
4	69	70
Commitment	46	42
Selling Own Solution	69	70
Goal Congruence	64	62
Conflict	43	44

Table 6  
Results of ANOVA of Coding Errors as a Function  
of Length of Training and Structure Rule Format

Source of Variation	Sum of Squares	DF	Mean Square	F
Training	1.406	1	1.406	0.514
Structure Rule Formats	1.569	3	0.523	0.191
Training X Structure Rule Formats	11.819	3	3.940	1.439
Error	416.142	152	2.738	
Total	430.936	159	2.710	



These findings, however, are inconsistent with previous research. Yetton (1975), investigating two forms of the structure rule, found one to be more effective in eliminating the incorrect coding of the rule. Earlier, Vroom and Yetton (1973) established training as an important element in the problem solving ability of subjects.

Several differences between the present study and previous research may account for these inconsistent results. Differences in age, maturity, and experience of the subjects must be noted. In previous research, subjects were middle- and upper-level managers with an average of ten years work experience. The present study involved general psychology students on an undergraduate college level. In previous research, managers were also paid for training while subjects in the present study volunteered. Thus, varying abilities and motivational differences might be expected. Older, more mature subjects who are involved in careers and paid for training may be more highly motivated and have more ability to understand the model than would college aged students. From a practical and financial perspective, the managers may see more value in learning the model than would general psychology students.

Consideration must also be given to the differences in trainers used to instruct the subjects on the Normative model. In the present study, the trainer was presented to the subjects as a graduate student collecting data for a

master's thesis. In previous research, the trainers were either experienced consultants or educators. In addition to more experience, it is likely that the latter group of trainers possessed a greater degree of credibility and prestige in the eyes of the subjects, and enhanced their motivation to learn the model. From their investigation of literature on source credibility and prestige, Lindsey and Aronson (1965) indicate that high-credibility sources motivate subjects to change their opinions and examine the content of a discussion more so than do low-credibility sources. The former are characterized as persons with high degrees of expertise, status, and intelligence. Thus high credibility trainers likely provide more motivation for subjects to learn the Normative model.

Differing training strategies are another factor which must be considered. In previous research, training sessions have varied from one to five hours in length (Vroom and Yetton, 1973). In the present study, the training was either thirty or ninety minutes. In previous research, the one hour training session consisted of eight British managers from a variety of firms. They received a copy of the Normative model and a handout regarding the definitions of each attribute. A short lecture concerning the model was given to them. The three hour training session consisted of thirteen American managers from a division of a large public utility. They also received a copy of the model and



handout regarding the definitions of each attribute, and approximately two hours of instruction over the model. Subjects in the three hour training session received practice applying the model to four situational problems. The five hour training session consisted of nineteen American students in a course in elements of administration. They did not receive copies of the model or the handout regarding the definitions of each attribute. However, they did receive approximately five hours of instruction on the problem attributes. The instruction included practice in applying the model to a large number of situational problems. In the one to five hour training sessions, subjects not only received different amounts of training but also different forms of training.

The thirty or ninety minutes of training conducted in the present study consisted of describing the taxonomy of decision making strategies, seven rules, decision tree, and feasible sets of leadership styles to all subjects through a lecture method. Handouts were given to all subjects describing the various parts of the model. Subjects in the maximum training condition only received practice applying the model during training. The time spent in explaining the various parts of the model was either ten or thirty minutes. Therefore, it can be seen that the differences between the length and type of training conducted in the

present and previous research may help to account for the inconsistent results noted between the studies.

The present study offers a number of implications for future research. Spaced versus massed and whole versus part training are important areas of investigation. One form of training may be more effective than another in helping subjects learn and apply the Normative model. In the present study, the entire model was presented during a thirty or ninety minute training session. In previous research, the entire model was presented during the first day of training. In future research, the model could be presented over several days. The first day could concentrate on the taxonomy of decision making strategies and the seven rules. The second day could concentrate on the decision tree and feasible sets of leadership styles. In the present and previous research, the model was taught in a whole form. Each part of the model was related to the other parts of the model as it was taught. The seven rules were related to the decision tree and the decision tree was related to the feasible sets of leadership styles. However, when the model is taught in a part form individual segments of the model are taught initially, and then at some later point in time the different parts would be combined. The taxonomy of decision making strategies, the seven rules, the decision tree, and the feasible sets of leadership styles would be taught without relating one to another.



Then at the end of training they would be combined together to indicate how the model operates.

In addition to a lecture method, a number of alternative training methods could be used to present the model to subjects in a whole versus part or massed versus spaced form. For instance, programmed instruction machines could be used to present the model. In this type of training, each step of the model is explained with examples and application problems for the subjects to work. Since criterion levels must be reached before subjects can proceed in training, experimenters may feel more confident using programmed instruction for training subjects on the Normative model.

Role playing could also be used to present the model in a whole versus part or spaced versus massed form. The taxonomy of strategies could be described by subjects acting out the autocratic, consultive, group, and delegative forms of decision making. Since role playing gives subjects an active role in the training process, subjects may take more interest in learning and applying the model. Video tapes, films, slides, and handouts could also be used to supplement the learning process.

Given the limitations of the present study, future research should continue to investigate different forms of the structure rule to eliminate the problem of coding errors. One way this could be accomplished is by breaking the rule

down into a number of segments. For instance, "Do I know what information is needed, who possesses it and how to collect it to make a high quality decision." By continual research of the structure rule, the coding error problem associated with the rule may be eliminated.

In future research, training sessions should be increased beyond ninety minutes. The in-depth training conducted in previous research apparently gave subjects a greater understanding of the Normative model than thirty or ninety minutes of training. Therefore, the differences in the length of training apparently contributed to the inconsistent results of these studies. Consequently, future research should investigate where between three days and ninety minutes subjects can gain an adequate understanding of the Normative model.

In future research, more effort should be spent trying to involve the subjects in the study. In the present study, subjects were told that the experiment would give them an indication of how much leadership ability they possessed. This statement, however, may not have been sufficient to motivate the subjects to learn the Normative model. A statement which may have motivated the subjects further may have been one that indicated that subjects' leadership potential could not only be identified but developed through



using the model. It is hoped that this type of involvement will motivate subjects to take more interest in learning the Normative model.

There are also a number of situations in which the utility of the Normative model has not been investigated. The model may be more effective for training subjects at an earlier age than has been previously attempted. The model may be more applicable for developing the leadership ability of children than adults. The model may also be more effective for training subjects in a number of career areas that have not been investigated. Subjects in past research have been chosen from the industrial or educational areas. However, subjects from other occupations may gain more benefit from training. The training of school administrators or supervisory nurses may be more effective than the training of executives or managers.

The different areas in which the Normative model may be effective in developing leaders are endless. Therefore, further investigation of the model needs to be undertaken in the future. In this way, the complete utility of the model will be made known.

Appendix A



## Structure Rule Formats

Original Statement of the Structure Rule. Do I know exactly what information is needed, who possesses it, and how to collect it?

Abbreviated Modified Statement of the Structure Rule. Can I give a clear operational definition of the problem and specify some of the alternative solutions and strategies for their implementation.

Complete Modified Statement of the Structure Rule. Can I give a clear operational definition of the problem and specify some of the alternative solutions and strategies for their implementation. For the problems for which I can do this, the group as a whole will decide on the optimal solution, whereas for the other cases, I will discuss how I would go about deriving an adequate solution.

Corrected Modified Statement of the Structure Rule. Can I give a clear operational definition of the problem and specify some of the alternative solutions and strategies for their implementation. For the problems for which I can do this, I alone will decide on the optimal decision, although I may consult with the group if necessary. If I cannot give a clear operational definition of the problem and specify some of the alternative solutions and strategies for their implementation, I will discuss the problem with the group and derive an optimal solution.

## Appendix B



### The Eight Experimental Groups

Group One. Minimum training and the original statement of the structure rule.

Group Two. Minimum training and the abbreviated modified statement of the structure rule.

Group Three. Minimum training and the complete modified statement of the structure rule.

Group Four. Minimum training and the corrected modified statement of the structure rule.

Group Five. Maximum training and the original statement of the structure rule.

Group Six. Maximum training and the abbreviated modified statement of the structure rule.

Group Seven. Maximum training and the complete modified statement of the structure rule.

Group Eight. Maximum training and the corrected modified statement of the structure rule.

Appendix C



### Instructions for Coding Problems

After reading each of the cases, you should answer a set of questions concerning it. The questions are shown below and following each question is a detailed discussion of the attribute which it is expected to reflect and considerations which should bear on your answer.

1. Quality Rule. If decision were accepted, would it make a difference which course of action were adopted? This attribute refers to the importance of finding a high quality solution independent of the need to satisfy any acceptance criteria. There are some problems for which the nature of the solution reached is not critical at all. Within the constraints specified in the problem you are (or should be) indifferent among the possible solutions. The number of solutions which meet the constraints is finite and the alternatives do not require substantial search. All such solutions have identical expected values, provided that those who have to carry them out are committed to them. Problems of this type should be coded NO. They are essentially of two kinds: (1) Neither the quality nor the acceptance of the decision is critical. You could flip a coin to decide which course of action to adopt. (2) Quality is unimportant but acceptance is critical.

All problems with any technical, rational, or analytical component should be coded YES. In such instances, some solutions are always better than others (less costly, more effective in attaining the objective, etc.), and you should not be indifferent as to which is chosen.

2. Information Rule. Do I have sufficient information to make a high quality decision? This attribute refers to the extent to which you have sufficient information, skill, or expertise to solve the problem by yourself without the aid of your subordinates. The information referred to concerns the technical or rational side of the problem, i.e., you are asked if you have the information needed to achieve the external objective, not the information as to what solution would most please your subordinates. Note that what is called for is a judgment about your knowledge in relation to the demands of the problem, not a relative judgment of your knowledge versus that of your subordinates.

3. Structure Rule. Do I know exactly what information is needed, who possesses it, and how to collect it? This attribute refers to the location and specificity of the information. There are some problems for which missing information is highly specific. The problem is structured, the variables that enter into the final solution are known, and the task of finding what is technically the optimal solution consists of measuring these variables. You know exactly what information (levels of variables) is missing, where (in whose head or file) it is stored, and how to access it or retrieve it from storage. The task of information retrieval can be likened to that of looking up unknown facts in a reference book, even though the information here is contained in human memories rather than in printed sources. If these above conditions are satisfied, the attribute should be coded YES. There are other problems for which the information is missing or its location is not so easily identified, and the method of retrieving it is necessarily more cumbersome. The problem is unstructured, and the alternatives and criteria for their evaluation are unknown. If these latter criteria are satisfied, the attribute should then be coded NO.
4. Goal Congruence Rule. Can subordinates be trusted to base solutions on organizational considerations? This attribute refers to the extent to which subordinates would be motivated to pursue a solution to the problem which is rational from the standpoint of the goals of the organization, rather than their own self-interest. As used here, the term TRUST deals with the motivation of subordinates rather than their information, knowledge, or expertise. (The used-car salesman might be most knowledgeable concerning the reliability of the cars on his lot, but one might be reluctant to delegate the choice of car to him due to a belief that he might be motivated to do other than choose the best value for the money.) In responding to this question, search for evidence in the problem of a common or superordinate goal, or of an area of mutual interest. When these conditions exist, you are more likely to trust your subordinates. In a sense you are all in "the same boat," having a common dilemma or objective. Respond NO if, in the course of trying to solve the problem, solutions suggested by, and acceptable to, the subordinates are likely to violate corporate goals. Respond YES if in the course of solving the problem your subordinates would attempt to promote, or at least not damage, organizational objectives.



5. Commitment Rule. Is acceptance of decision by subordinates critical to effective implementation? This attribute refers to the importance of getting acceptance or commitment to the solution or decision on the part of your subordinates. If none of your subordinates is involved in executing the decision or solution, your response to this question should be NO. If they are involved in its execution but the nature of their involvement is such that compliance rather than acceptance is sufficient for its implementation, your response should also be NO. Your response should be YES if the success or failure of the decision hinges to an important degree on enthusiastic support of the decision by your subordinates. In such instances one or more of the following conditions would be expected to be found:

1. More than compliance to specified directives is required for effective execution; that is, the task of execution requires judgment or creativity on the part of those executing it.

2. The conditions necessary for securing compliance, ability to monitor and punish deviations from directives, are not present.

3. Attempts at securing compliance are likely to have serious side effects on other decisions; for example, the subordinates might leave the organization.

6. Selling Own Solution Rule. If I were to make the solution by myself, is it certain to be accepted by my subordinates? This attribute refers to the extent to which you believe that your decision, made automatically, would be likely to receive acceptance from your subordinates. There are some situations in which subordinates expect their superior to make the decision because he occupies the position he does, or because he is the acknowledged expert, or the only person capable of taking all the necessary factors into consideration. In such situations it is not at all difficult for the leader to "sell" his decision.

The prevalence of this condition has been shown to vary with a number of factors, including:

1. Culture: In some countries, particularly in those less developed, the preexisting authority and status hierarchy is preeminent, and the right of those occupying positions over you to make decisions that affect your behavior is seldom questioned.

2. The personalities of the subordinates: Within a given culture people vary in their desire to participate in decisions affecting them.

7. Conflict Rule. Is conflict among subordinates likely in preferred solution? This attribute refers to the conflict or disagreement expected to exist among subordinates in their preferred solutions to the problem. There are many situations in which, at least initially, there is high variance in opinions concerning what constitutes a "good" solution to a particular problem. These may include:

1. Situations in which there is substantial commitment to the organizational goals to be pursued, but disagreement concerning the appropriate course of action. (TRUST would be coded YES, CONFLICT coded YES.)

2. Situations in which there is no commitment to the organizational goal and disagreement concerning the most effective means of attaining it. (TRUST would be coded NO, CONFLICT coded YES.)

These are to be distinguished from:

3. Situations in which there is likely to be both substantial commitment to the organizational goal and agreement on how to attain it. (TRUST would be coded YES, CONFLICT coded NO.)

4. Situations characterized by substantial commitment to a goal other than an organizational one, and agreement on how to attain it. (TRUST would be coded NO, CONFLICT coded NO.)



### Instructions to Subjects Coding Problems

You should now read the first of the fifteen problems which have been given to you. You should use the seven rules to code the problem and write a "yes" or "no" answer to each rule on the answer sheet. Please write only on the answer sheet. Do not make any other marks on the handouts. Use the handout containing the definitions of each attribute to refer to when coding the problem. On the answer sheet if the quality rule is coded "yes," skip the information and structure rules. If the information rule is coded "yes," skip the structure rule. If the selling own solution rule is coded "no," then skip the commitment rule. Once you have finished coding the first problem, go on to the rest of the fifteen problems. Take as much time as you need to answer each problem. Once you have completed all fifteen problems, place the answer sheet in the handout describing the model and turn all material in before leaving. Thank you very much for your time and cooperation.

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